## Remarks

The pending claims are 16 and 18-29.

Independent claims 16 and 27 have been amended to indicate that the total concentration of oxygen in the combined gaseous feeds entering the reactor is at least 9 volume percent. Further, claim 26 has been amended to present a range of total oxygen concentrations as 9 to 15 vol.% and claim 29 has been added to present the same range of oxygen concentrations as a dependent claim to claim 27. Basis for these amendments is found in the original specification at page 9, line 10.

### Summary of Invention

Appellants' invention is directed to a fluidized bed, gas-phase, process for manufacture of vinyl acetate from ethylene, acetic acid, and oxygen. In Appellants' process, separate feed streams primarily containing hydrocarbons and oxygen are introduced into a fluidized bed reactor, such that neither feedstream nor the outlet gas from the reactor is within flammability limits. Because oxygen is consumed in the reactor through catalytic oxidation of ethylene and acetic acid to form vinyl acetate, the oxygen concentration in the reactor will be lower than the sum of components of the input feedstreams. Also, because the oxygen concentrations in the feedstreams are constrained by safety concerns of creating an explosive mixture, separation of the feedstreams results in an effective higher usage of oxygen in the reactor. This increases the oxidation efficiency of the catalytic oxidation reaction.

Separation of the primary oxygen feedstream from the primary hydrocarbon feedstream is possible in Appellants' fluidized system because the fluidization medium in the reactor will prevent uncontrolled oxidation at the point of entry of the oxygen feedstream into the reactor. In contrast, a separate introduction of high concentration oxygen into a fixed bed catalytic reactor system would not be possible because of the probable creation of a "hotspot" at the point of entry.

Significantly, the invention claimed in independent claim 16 requires that the total amount of oxygen employed is higher than may be used without danger of flammability, if all streams were combined. In independent claim 27, the levels of oxygen employed are higher than may be used in a fixed bed reactor, without danger of flammability.

Appellants' invention results in a more efficient oxidation reaction within acceptable safety restrictions.

Summary of the Bases for the Rejections

A. The Examiner rejected claims 16-28 under 35 USC §103(a) over Sennewald et al. (GB 1,266,623) and Sennewald et al. (GB 1,266,624). The Examiner stated that the primary references teach the claimed process except oxygen is not introduced in a further inlet. The Examiner further asserted that whether oxygen is added with the other reactants or separately "appears to be merely an arbitrary choice," since one would expect all reactants to undergo the same reaction whether the mixing occurs before the reaction zone or within the reaction zone. The Examiner further asserted that the limitations added in the instant application are not seen to further distinguish the claims from the prior art. Specifically, the added limitation as to sufficient amount of particulate material in the reactor to allow dissipation of heat was dismissed a reciting an inherent property of a fluid bed catalysts "does not define a catalyst that [is] different from the prior art catalysts. Further, the limitation to total oxygen content was not seen to be substantially different from what is taught in the prior art. The Examiner noted that "the claims appear to read on the amount exemplified in the prior art, note Example 2 of the references [Sennewald] uses 8% oxygen which is apparently within the claimed range.

B. The Examiner rejected claims 16-28 under 35 USC §103(a) over Sennewald et al. (GB 1,266,623) and Sennewald et al. (GB 1,266,624) optionally in view of Calcagno et al. (US 3,714,237). In addition to the combination of Sennewald '623 and Sennewald '634, Calcagno et al. was cited as suggesting that oxygen may be added separately in the acetoxylation art, although Calcagno et al. operates in the liquid phase.

The Examiner's Answer in the preceding appeal further states the current bases for rejections of the claims. For example, the Examiner states that "appellants have failed to demonstrate that 8% is not within the claimed range."

The Examiner points to Example 2 in the Sennewald et al. references in which a particular acetoxylation reaction reportedly contained 8 vol.% of oxygen. The Examiner queries how this example is outside of Appellant's claims.

Applicants' Current Submission

Although Applicants disagree with the Examiner's analysis of the scope of the prior independent claims, Applicant has amended these claims to clarify that amount of oxygen used in their process is both above the flammability limits if the feedstreams were combined and that the amount of oxygen is above 9 volume percent.

With this amendment, it is now clear that the art cited by the Examiner (Sennewald et al.) does not suggest the concentration of oxygen required in Applicants' claimed invention. This is true for two reasons. The specific example Sennewald et al. referred to by the Examiner only teaches oxygen at an 8 vol.% level and, further, Example 2 in Sennewald et al. undoubtedly is operating outside flammability limits for the particular system described by Sennewald et al. Applicants submit that Sennewald et al. does not show operating using amounts of oxygen above flammability limits in their single input stream example and certainly does not show operating at a concentration of above 9 vol.%.

The Examiner asserted that no unexpected result is seen using Appellants' invention. In this regard, Appellants point to the demonstrated advantages of their process of increasing the effective oxygen content. The data presented in Appellants' specification demonstrate a clear and substantial increase in ethylene conversion as the oxygen content is raised to levels unobtainable by conventional means. Specifically, in the series of runs identified as examples 3 to 7, the ethylene (C2=) conversion increases from 6.0% for the low oxygen run (Ex. 3) to 10.2% for a high oxygen run (Ex. 7). Similarly, in the series of runs identified as examples 9 to 12, the ethylene ($C_2H_4$) conversion increases from 12.9% for a low oxygen run (Ex. 9) to 20.5% for a high oxygen run (Ex. 11). In another series, ethylene ($C_2H_4$) conversion increases from 11.1% for a low oxygen run (Ex. 14) to 16.9% for a high oxygen run (Ex. 15).

Other Matters

With respect to other matters, the Examiner asserted that the Williams Declaration was not part of this appeal. Applicants point to their submission in response to the first Office Action in the present application which stated:

> "Applicants note the rejections of the claims submitted in this application are the same as made in the parent case. Without unduly burdening the record, Applicants incorporate by reference their arguments made in the Appeal Brief submitted in the prior application with respect to the cited

references together with evidentiary submissions including the Williams Declaration."

Thus, Applicants believe that the Williams Declaration is part of the present record. A copy of the Williams Declaration is attached hereto.

The Williams Declaration is submitted to present evidence of the difference between liquid phase and gas phase systems.

Summary

Applicants' currently-presented claims require features not described in the cited art. Significantly, all of the pending claims now require operation of a process using oxygen feeds higher than the art would have considered acceptable in regard to safety and require a concentration of above 9 vol.% which is outside the teaching of the primary cited art. This operation directly leads to higher activity and throughput and more efficient operation. Thus, Applicants submit that all pending claims are in condition for allowance and request the Examiner to reconsider the rejections.

Respectfully submitted,

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